The Sound of Making Money

Machine downtime cuts into profits more than you think.

Regardless of size, location or type, there are only two sounds that resonate from a manufacturer's shop floor: the sound of making money and the sound of spending money. It goes without saying that investments in equipment, material, supplies and manpower are most quickly recouped when costly cutting machines are noisily slicing or punching metal at full capacity.

The Cost of Unplanned Stoppages	
Length of Shift/Hours	8
Length of Shift/Minutes	480
Expected Shift Productivity/Minutes	400
Machine Rate, $/Hour	$120
Machine Profitability, Basis %	25%
Machine Value Per Shift (8 Hours x $120)	$960
Machine Profit Per Shift ($960 x .25)	$240
Number of Profitable Minutes Per Shift (480-400)	80
Profit %/Minute of Profit Minutes ($3/$240)	1.25%
Value of a Profit Minute ($240/80)	$3

Source: SigmaTEK

Considering that no profit is made until the costs are paid, it follows that machine stoppages eat directly into profits. At a machine rate of $120 per hour, a 30 minute stoppage appears to cost $60. But at a profit rate of $3 per minute, the actual cost of that first stoppage is $90 in lost profit.

Conversely, nothing drains capital from a manufacturing organization faster than the deafening sound of silence. With all due respect to the programmer, machine operator, CEO—and any other individual for that matter—fabrication machines are arguably an organization's most valuable asset. When these machines are down, it's not only money being spent correcting the mechanical problem. Money is also left on the table because of missed delivery schedules, cost over-runs, and lost opportunities to use that same time on cutting material.

Machine crashes are costly

One increasingly significant problem stems from a fabricator's quest for speed. In an effort to cut metal as quickly as possible, countless cutting heads are needlessly damaged. This damage generally occurs as a result of heads colliding with parts or island scrap on the cutting table. This is most often caused by cut parts (or loose materials between parts) that have shifted during the run and now protrude onto a plane higher than the plate/sheet surface.

When the cutting sequence takes the head back into the vicinity of a previous cut, there is always the chance of a collision with a protruding part. When a crash between machine and material occurs, the damage to the head is often serious and sometimes fatal. Laser head replacement can run from $10,000 to $30,000—not a trivial expense. Likewise, machine time and man hours lost recalibrating or replacing damaged cutting heads are significant and non-recoupable.

Unplanned stoppages cost more than ever

If you consider that the machines are very expensive and that the throughput is higher than ever, it follows that every minute of machine time is worth more to your business. Therefore, every minute the machine is not cutting, or not cutting correctly, costs more money than ever before.

By definition, no profit is realized until all costs are covered. In a typical day, a fabricating company has X number of hours to make a profit. Obviously, the imaginary line when a company begins making money does not come at the beginning of the day. Take a typical eight-hour shift as an example. The transition from cost to profit most likely does not occur until the final couple of hours. Any downtime shortens the work day and shrinks the window on profitability (see chart).

***SigmaTEK Systems LLC**, Cincinnati, supplies SigmaNEST, SigmaTUBE, SigmaMRP and other software products and services for automated part production. For more information, call 513-674-0005 or visit **www.sigmanest.com**.*

***Editor's note:** This article was contributed by the experts at SigmaTEK Systems.*

> *"Productivity is more than just simple speed. For manufacturers, the road to profitability begins with keeping fabrication machinery running at fill capacity."*

Software's the solution

Today, sophisticated software can safely squeeze every bit of speed from cutting machines. Moreover, issues associated with crashes can be anticipated and avoided. A good manufacturing software program should feature Intelligent Sequencing, which involves processing the parts, and the features of each part, in a sensible order. This protects the machine, as well as maintaining part quality and efficiency. Software should also handle threat detection and avoidance of previously processed areas that pose a hazard. The software needs the smarts to recognize areas of danger, such as tipped up parts or floating scrap. Considering the risk of a stoppage, it is often faster to go around a part than to cross over it.

Slow down to go faster

Many modern lasers can position at speeds in excess of 3,000 inches per minute or 50 inches per second. Large parts are more likely to lie flat, posing minimal risk. Conversely, parts that have a width less than the gap between three table slats are the most dangerous. These parts are probably less than 12 inches in either X or Y for most machines.

For example: A 12-by-12 inch part will be 16.97 inches on the diagonal. To cross this part fully might take up to 0.339 of a second. On the other hand, to go around this part and avoid it entirely will be 24 inches of travel or 0.48 of a second. So in the literal blink of an eye, 0.15 of a second of travel completely eliminates the risk of a crash. So while it might be slower up front—in the end it will probably be faster.

The complete answer must stem from a fabrication software solution that does not compromise productivity. Productivity is more than just simple speed. For manufacturers, the road to profitability begins with keeping fabrication machinery running at full capacity. Fortunately, today's leading fabrication software has kept pace with cutting machine advancements to maximize cutting productivity while leveraging the physical cutting capabilities of the equipment to its fullest. ■